SPANCRETE MANUFACTURERS ASSOCIATION

RESEARCH NOTES

LOAD-BEARING TOP CONNECTION DESIGN FOR SPANCRETE HOLLOWCORE WALL PANELS

When Spancrete hollowcore wall panels are used in a Load-Bearing situation, the roof load is typically applied to the inside face of the panels. Connections are required to transfer the load into the panel. A series of tests was conducted to determine the load transfer capacity of a channel insert cast into the inside surface of a panel. Variables in the test program included load eccentricity, channel length, channel anchorage and proximity to the top end of the panels.

The channels were C4 x 5.4 standard rolled sections. The anchorage used allows the inserts to be tied to the strands on the casting bed so the Spancrete machine can run over the channels without mechanical interference. The anchorage consisted of 2 - #3 rebars extending 8 inches beyond each end of the channel. The bars were welded to the tips of the channel flanges as shown in the figure below.

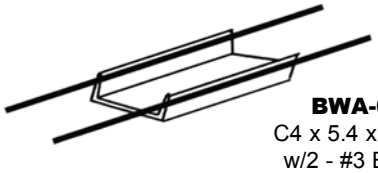
CONCLUSIONS:

There is not a significant interaction of shear and tension with eccentric shear loads. Therefore, the following recommendations are made for channel capacity:

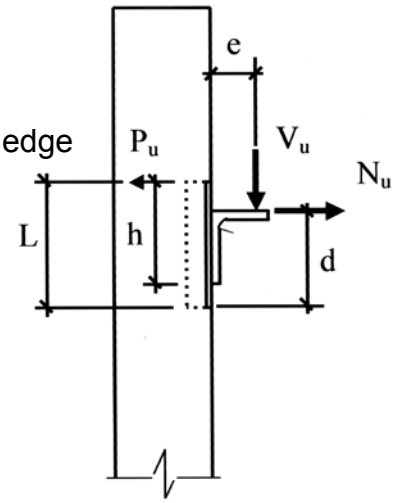
$V_u \leq \varnothing V_n$ and $P_u \leq \varnothing P_n$

where $P_u = \frac{V_u e}{h} + \frac{N_u d}{L}$ using the figure below

where V_n = 34k for 12" or 18" channel loaded away from free edge
and P_n = 3.75k for 12" channel with 2" to 8" edge distance
= 4.75k for 18" channel with 2" to 8" edge distance
= 5.10k for either channel with edge distance > 8"



BWA-6
C4 x 5.4 x 1'-0"
w/2 - #3 Bars



A design example is given on the reverse side.

Research Notes are produced periodically by the SMA Technical Committee. SMA Research Notes are based on testing done for the Spancrete Manufacturers Association. The information contained in these Research Notes should be used by those experienced in structural design and should not replace sound engineering judgment.

SPANCRETE MANUFACTURERS ASSOCIATION

DESIGN EXAMPLE

LOAD-BEARING TOP CONNECTION DESIGN FOR SPANCRETE HOLLOWCORE WALL PANELS

GIVEN:

Details and loading conditions as shown

PROBLEM:

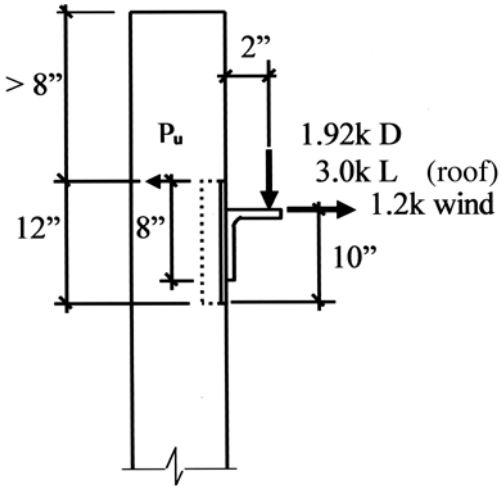
Check capacity of 12" long channel anchor

SOLUTION:

For dead and live loads only.

$V_u = 1.2(1.92) + 1.6(3.0) = 7.10k$

$P_u = 7.10\ (2) / 8 = 1.78k$



Applying the recommended PCI connection factor,

$V_u = 1.3(7.10) = 9.23k$ [$< \varnothing V_n = 0.70(34) = 23.8k$, OK]

$P_u = 1.3(1.78) = 2.31k$ [$< \varnothing P_n = 0.70(5.1) = 3.57k$, OK]

For dead plus live plus wind loads,

$V_u = (1.2)(1.92) + (.5)(3.0) = 3.80k$

$P_u = \frac{3.80(2)}{8} + \frac{(1.6)(1.2)(10)}{12} = 2.55k$

With the connection factor,

$V_u = 1.3(3.80) = 4.94k$ [$< \varnothing V_n = 0.70(34) = 23.8k$, OK]

$P_u = 1.3(2.55) = 3.32k$ [$< \varnothing P_n = 0.70(5.1) = 3.57k$, OK]

Note: Sample calculations are intended to illustrate the concept presented and do not represent all considerations necessary for the complete design.